

“ADVANCEMENTS IN SUBSURFACE IMAGING / GEOPHYSICAL MAPPING”

For nearly four decades subsurface imaging has been successfully deployed for near-surface engineering and geologic problems, and it is clear the application is growing thanks to industry advancements. For example, advancements applied from: 1) eight decades of success in large scale resource exploration; 2) high-speed / high-powered computing and faster instrumentation; and, 3) better integration of geo-data for visualization and calibration of geophysical results, have each added to the success achievable with geophysical imaging and modeling. Deployment of better hardware at an effective scale to provide high-resolution imaging of near-surface geologic conditions, coupled with faster interpretation and visualization of the results will continue to make engineers and geoscientists value its use. Based on personal experience, I have witnessed a significant increase in reliance on geophysical results by Federal, state and industry to solve complex geotechnical and environmental problems. When calibrated with conventional geotechnical investigation results, geophysical information is proving to add tremendous value for better asset management, site characterization for design and/or mitigation of hazards, and reduce the risk and overall costs for both small and large-scale projects.

Numerous industries are reveling from the same advancements in technology, for example medical, gaming, and electronics are all achieving more use while adding greater value to us / the public. When it comes to public safety however, the ground imaging technologies should not be overlooked or undervalued. This presentation will be a non-commercial and non-technical discussion showing how the geophysical industry is working to achieve greater value, at better cost, to enhance the ability to image and model the subsurface. The primary focus of this presentation will be on ***the most recent technological advancements for hardware, software and visualization***. When put in context of the geophysical industry many are not commonly known, but are commercially available and practical to problems that likely cross your desk. Multiple methods and multiple objectives will be addressed, because geophysicists are being asked to acquire data in (*more difficult*) urban settings; achieve greater resolution, while acquiring more (data) for less (budget).

Lastly the presentation will attempt to combine the need from geophysicists (me) to better understand your engineering needs, for example on structural or site assessment, and health monitoring, while addressing our aim to better understand what you need from our results to effectively aid design, excavation and construction. It is well-established that subsurface imaging is a supplement to surveying, geologic mapping, intrusive (i.e., cone or drilling) and laboratory measurements; however, what's not evident is the value geophysics adds when used properly, both on a project timeline but proper use of a variety of method(s). Thus, my approach will be to help you better understand developments in technologies within our geophysical 'tool-box'. It is no longer acceptable to simply know if seismic or electrical imaging is sufficient, it is now getting to the level-of-understanding of 1D, 2D, 3D or even 4D survey needs to be more fully recognized as critical.

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Mr. Sirles has been accredited by the IACET (International Association for Continuing Education and Training), and also provides educational opportunities for PDH's and CEU's through such organizations as ASCE, ACSM, AEG, EEGS, and FHWA. In 2016 Mr. Sirles received the highest achievement award in his industry from the Environmental and Engineering Geophysical Society (EEGS) – the John Nichol Award; it is for outstanding achievements to the geophysical community and outreach to industry.